

AMSAT News Service Weekly Bulletins

Issue: ANS-016

Date: 2022-01-16

Sources: amsat-ans-2022-ans-016-weekly-hyperkitty-ab58a894c9.txt

AMSAT NEWS SERVICE

ANS-016

The AMSAT News Service bulletins are a free, weekly news and information service of AMSAT, The Radio Amateur Satellite Corporation. ANS publishes news related to Amateur Radio in Space including reports on the activities of a worldwide group of Amateur Radio operators who share an active interest in designing, building, launching and communicating through analog and digital Amateur Radio satellites.

The news feed on <http://www.amsat.org> publishes news of Amateur Radio in Space as soon as our volunteers can post it.

Please send any amateur satellite news or reports to: [ans-editor \[at\] amsat.org](mailto:ans-editor@amsat.org)

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<https://mailman.amsat.org/postorius/lists/ans.amsat.org/>

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ANS-016 AMSAT News Service Weekly Bulletins

To: All RADIO AMATEURS

From: Radio Amateur Satellite Corporation

712 H Street NE, Suite 1653

Washington, DC 20002

DATE 2022 Jan 16

SpaceX Rideshare Mission Carries Multiple Amateur Satellites

A SpaceX Falcon 9 placed more than 100 smallsats into orbit on January 13 as the company accelerates the pace of its dedicated rideshare missions. The mission, dubbed Transporter-3, or TR-3, carried a number of Amateur Radio satellites to orbit.

The Falcon 9 lifted off from Space Launch Complex 40 at Cape Canaveral Space Force Station in Florida at 15:25 UTC. The upper stage reached orbit eight and a half minutes later and, after a second burn 55 minutes after liftoff, deployed its payloads into a 525-kilometer sun-synchronous orbit over the following half-hour.

The Falcon 9 first stage landed at the company's Landing Zone 1 at Cape Canaveral, the first land landing of a Falcon 9 booster since the Transporter-2 rideshare mission in June 2021. The booster was on its tenth flight, having first launched in May 2020 on the Demo-2 commercial crew mission for NASA. It subsequently launched the ANASIS-2 satellite, CRS-21 cargo mission, Transporter-1 and five Starlink missions before Transporter-3. SpaceX is planning up to three more dedicated rideshare launches this year.

SpaceX said that the TR-3 launch carried 105 spacecraft. Among them were the long-delayed EASAT-2 and Hades satellites from Spanish satellite organization AMSAT-EA, and the Tevel mission consisting of 8 satellites developed by the Herzliya Science Center in Israel. All ten of these satellites carry FM repeaters, among other function, and are detailed in the following stories.

[ANS thanks SpaceNews.com for the above information]

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 The 2022 AMSAT President's Club coins have arrived!

To commemorate the 50th anniversary of its launch on

October 15, 1972, this year's coin features

an image of AMSAT-OSCAR 6.

Join the AMSAT President's Club today and help

Keep Amateur Radio in Space!

<https://www.amsat.org/join-the-amsat-presidents-club/>

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Tevel Mission Launched on SpaceX Transporter-3 Mission January 13

The Tevel mission consisting of 8 satellites developed by the Herzliya Science Center in Israel, each carrying an FM transponder, was launched on January 13 at 15:25 GMT on the SpaceX Falcon-9 Transporter-3 mission. This mission also carries AMSAT-EA's EASAT-2 and HADES satellites.

Tevel-1, Tevel-2 Tevel-8

Beacon transmissions on 436.400 MHz, (9600bps BPSK G3RUH)

FM transponders uplink frequency: 145.970 MHz|

FM transponders downlink frequency: 436.400 MHz

All 8 satellites will have the same frequencies, so as long as the footprints are overlapping, only one FM transponder will be activated. The satellites were built by 8 schools in different parts of Israel.

Prelaunch TLEs:

Deployment number 28

TEVEL-4/TEVEL-5

1 12345U 22-T3TE 22013.69008102 0.00000000 00000-0 00000-0 0 9997

2 12345 97.3652 83.6317 0010843 246.0911 147.6817 15.12493461 06

Deployment number 30

TEVEL-1/TEVEL-2/TEVEL-3

1 12345U 22-T3TE 22013.69038194 0.00000000 00000-0 00000-0 0 9991

2 12345 97.3658 83.6317 0009074 254.1211 141.2940 15.11975594 07

Deployment number 55

TEVEL-6/TEVEL-7/TEVEL-8

1 12345U 22-T3TE 22013.69375000 0.00000000 00000-0 00000-0 0 9991

2 12345 97.3676 83.6318 0009046 252.0606 161.7026 15.11914367 05

Control station will be 4X4HSC at the Herzliya Science Center.

[ANS thanks David Greenberg, 4X1DG, for the above information]

EASAT-2 and Hades Satellites with FM Repeaters Are Launched

The Scottish space broker Alba Orbital has confirmed the launch of the EASAT-2 and Hades satellites in the Falcon-9 vehicle, using the company's AlbaPOD ejector for this purpose. The launch took place as scheduled on January 13 at 15:25 UTC (16:25 Spanish peninsular time). Both satellites should have been launched a year ago, but the problems of the Momentum integrator, on whose Vigoride vehicle Alba Orbital's AlbaPod ejectors were to be integrated with the American administration, caused this delay. Momentum was replaced by Exolaunch for the flight.

Both satellites offer FM voice communications and data retransmission in FSK or AFSK up to 2400 bps, such as AX.25 or APRS frames. They also emit FM voice beacons with the callsigns AM5SAT and AM6SAT, as well as CW.

The EASAT-2 satellite, designed and built jointly by AMSAT-EA and students of the European University of the Degrees in Aerospace Engineering in Aircraft and in Telecommunications Systems Engineering, with contributions from ICAI in the communications part, incorporates as an experimental load Basaltic material from Lanzarote, similar to lunar basalts, provided by the CSIC's research group on meteorites and planetary geosciences at the Institute of Geosciences, IGEO (CSIC-UCM) and which could be used as a construction material on the Moon. This project was promoted and has the collaboration of the ETSICCP (UPM).

As for Hades, its payload consists of a miniature camera module that sends the captured images as an audio signal in SSTV mode. The SSTV formats it uses are compatible with Robot36, Robot72, MP73 and MP115.

The design is based on the one used in the successful mission of the PSAT2 satellite, an amateur radio satellite of the United States Naval Academy and the Brno University of Technology. This camera has been operational since June 25, 2019: (<http://www.aprs.org/psat2.html>).

The camera chip is the Omnivision OV2640, which provides a resolution of up to 2M pixels and compressed JPEG output. Resolution is limited by the internal memory of the CPU (MCU) that controls the camera to 320x240 (typical) or 640x480 maximum. The MCU selected for control is the STM32F446RET6, which has the smallest footprint possible with connection to DCMI peripheral, necessary for connection to the camera. Images can be stored in 2 MB serial flash memory. The complete SSTV encoder has managed to be implemented on a 4-layer PCB with dimensions of just 38x38mm.

The MCU can be fully controlled from ground stations. The firmware allows the sending of live camera images, images previously saved in flash memory or images encoded in ROM. It also provides advance PSK telemetry and imaging schedule with current status (event counters, temperature, voltage, light conditions, etc.) and a brief summary.

The described module has been developed and manufactured in the Radioelectronics Department of the Brno University of Technology in the Czech Republic. Both hardware and firmware designs with source codes will be available on Github under the MIT license (<https://github.com/alpov/SatCam>).

Initially, only the EASAT-2 repeater is active. The Hades one will be activated by telecommand a few days after launch.

The frequencies coordinated with IARU for both satellites are as follows:

EASAT-2

145.875 MHz uplink, Modes: FM voice (no subtone) and FSK 50 bps, AFSK, AX.25, APRS 1200 / 2400 bps

436.666 MHz downlink, Modes: FM voice, CW, FSK 50 bps, FM voice beacon
with AM5SAT callsign

Hades

145.925 MHz uplink, Modes: FM voice (no subtone) and FSK 50 bps, AFSK, AX.25, APRS 1200 / 2400 bps

436.888 MHz downlink, Modes: FM voice, CW FSK 50 bps, SSTV Robot 36, FM voice beacon with AM6SAT callsign

The description of the transmissions in English can be found in the .pdf document at:

<https://bit.ly/31VmA6W>

AMSAT-EA appreciates the reception of telemetry, voice beacons and SSTV images. A paper QSL is sent to those who send their transmissions. It can be done through the following link: <http://data.amsat-ea.org>

Preliminary post-launch Keplerian elements for EASAT-2 and HADES are:

1	99999U		22013.68430556	.000000000	00000-0	50000-4 0	02
2	99999	97.5220	83.8550 0002429	-171.2750	173.6400	15.12786821	04

[ANS thanks Felix Paez, EA4GQS, and AMSAT-EA for the above information]

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Need new satellite antennas? Purchase Arrows, Alaskan Arrows, and M2 LEO-Packs from the AMSAT Store. When you purchase through AMSAT, a portion of the proceeds goes towards Keeping Amateur Radio in Space.
<https://amsat.org/product-category/hardware/>

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SpaceX Launches TU Delft Mini-Satellite

During the Transporter-3 satellite launch by SpaceX on 13 January from Cape Canaveral a small satellite from Delft in the Netherlands also traveled into space. The DelfiQ is one of the smallest satellites in the world. Satellite researchers Alessandra Menicucci, Stefano Speretta and Sevkett Uludag from TU Delft designed and built the satellite themselves to demonstrate that technology on such a small scale can actually function in space. Swarms of these small satellites are better able than today's large satellites to observe the earth. They could play an important role in monitoring climate change and in fast wireless broadband connections, among other things.

An important goal of these tiny satellites is that they prove that even miniature-scale technology can still function in space. And moreover, that the satellites can be monitored from Earth and can be distinguished from space debris. A big advantage is that the development time is much shorter than for larger satellites, some of which still run on 20-year-old technology. “We can build and launch a whole new generation of instruments every one or two years, so we can always incorporate the latest technology,” says Speretta. In the future, satellite swarms may even play a role in high-speed wireless broadband connections.

The DelfiPQ measures just 5 by 5 by 18 centimetres, making it one of the smallest satellites in the world. The satellite is the third TU Delft

satellite to actually go into space. DelfiC3 was the first. This satellite has been in space for over 12.5 years and is still alive. DelfiN3xt was launched in 2013. Contact has recently been re-established with this satellite. University lecturer and project leader Alessandra Menicucci: "Whether the DelfiPQ also comes to life in space is the most exciting of all three. DelfiPQ is eight times smaller than its brothers. And those were already no bigger than a milk carton."

The DelfiPQ has UHF downlink for GMSK at up to 19k2. A downlink on 436.650 MHz has been coordinated.

[ANS thanks Delft University of Technology for the above information]

AMSAT Awards Update

As we have rolled into 2022, I am posting the awards from the last part of 2021 and a couple from 2022.

AMSAT Satellite Communicators Award for making their first satellite QSO

John Gesell, KB7JJG
Brian Lopeman, KI7WXP
Peter Stover, KD4QNA
James Gillanders, KG6HXN

AMSAT Communications Achievement Award

Richard Nolet, VA3VGR #639

AMSAT South Africa Satellite Communications Achievement Award

Richard Nolet, VA3VGR #242

AMSAT Robert W. Barbee Jr., W4AMI Award (1,000-4,000)

Edward Campagnulo, KN4ZAA #US120
Hector Martinez, W5CBF #US121 4,000 Upgrade
Keith Austermler, KB9STR #US122
Giancarlo Zanella, IK1DOC #US123
Dwight Fletcher, N1RCN #US124

AMSAT Robert W. Barbee Jr., W4AMI Award (5,000)

Hector Martinez, W5CBF #39
Mitchell Ahrenstorff, AD0HJ #40

AMSAT Rover Award

Rover	Call
=====	=====
#60	KF6J0Q
#61	VA3VGR

#62 N6UTC

GridMaster Award

#33 Dave Chasey, N9FN

#34 Douglas Tabor, N6UA

Our newest award the Reverse VUCC or VUCC/r

#03 James Clary, ND9M Upgrade to 385

#09 Randy Kohlwey, WI7P

To see all the awards visit <http://www.amsat.org> and click on Services then Awards.

[ANS thanks Bruce Paige, KK5D0, AMSAT Board Member and Director Contests and Awards, for the above information]

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AMSAT's GOLF Program is about getting back to higher orbits, and it all begins with GOLF-TEE – a technology demonstrator for deployable solar panels, propulsion, and attitude control, now manifested for launch on NASA's ELaNā 46 mission. Come along for the ride. The journey will be worth it!

<https://tinyurl.com/ANS-GOLF>

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First Ever Svalbard QO-100 DXpedition JW100Q0

A DXpedition to Svalbard (78° North) is planned for April 19-26 with the callsign JW0X. In addition to the five HF stations (FT8/FT4/RTTY/SSB/CW) the team will activate the first QO-100 satellite DX Station callsign JW100Q0 April 22-24.

Making the first ever QO-100 calls from Svalbard is the biggest challenge of this DXpedition. ON4CKM Cedric, ON4DCU Patrick and ON5UR Max will make a rugged snowmobile ride of almost 100 km in temperatures of -20° – 25° Celsius to reach their goal. Kapp Linné is the only place in the area that allows a view of the QO-100 satellite at only 3° above the horizon. Svalbard also lies on the edge of the satellite area (footprint), which makes the challenge even greater. We want to give as many radio amateurs as possible the opportunity to work this first QO-100 DXpedition. For this unique challenge we also have a special callsign JW100Q0.

Further info at:

Svalbard QO-100 JW100Q0 April 22-24

<https://www.dx-adventure.com/en/qo-100-our-goal/>

Svalbard JW0X April 19-26

<https://www.dx-adventure.com/en/svalbard-dx-pedition/>

QO-100 geostationary amateur satellite transponder provides coverage from Brazil to Thailand, see

<https://amsat-uk.org/satellites/geo/eshail-2/>

[ANS thanks AMSAT-UK for the above information]

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Want to fly the colors on your own grid expedition?
Get your AMSAT car flag and other neat stuff
from our Zazzle store!
25% of the purchase price of each product goes
towards Keeping Amateur Radio in Space
https://www.zazzle.com/amsat_gear

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Eight U.S. Schools Moved Forward in ARISS Selection Process

Amateur Radio on the International Space Station (ARISS) is pleased to announce the schools/host organizations selected for the July 1 through December 31, 2022, time period. A total of eight of the submitted proposals during the recent proposal window have been accepted to move forward in the processes of planning to host a scheduled amateur radio contact with crew on the ISS. The primary goal of the ARISS program is to engage young people in Science, Technology, Engineering, Arts and Mathematics (STEAM) activities and raise their awareness of space communications, radio communications, space exploration, and related areas of study and career possibilities.

The ARISS program anticipates that NASA will be able to provide scheduling opportunities for the eight US host organizations during the July 1 through December 31, 2022, time period. They are now at work completing an acceptable equipment plan that demonstrates their ability to execute the ham radio contact. Once their equipment plan is approved by the ARISS Technical Mentors, the final selected schools/organizations will be scheduled as their availability and flexibility match up with the scheduling opportunities offered by NASA.

The schools and host organizations are:

- * Buehler Challenger & Science Center, Paramus, NJ
- * Eaton Public Library, Eaton, CO
- * Davis Aerospace Technical High School, Detroit, MI
- * St. Stephen's Episcopal School Houston, Houston, TX
- * Harris Middle School, Spruce Pine, NC
- * Kopernik Observatory & Science, Vestal, NY
- * Monroe Carell Jr. Children's Hospital at Vanderbilt, Nashville, TN
- * Canterbury School of Fort Myers, Ft Myers, FL

Amateur Radio on the International Space Station (ARISS) is a cooperative venture of international amateur radio societies and the space agencies that support the International Space Station (ISS). In the United States, sponsors are the Radio Amateur Satellite Corporation (AMSAT), the American Radio Relay League (ARRL), the ISS National Lab-Space Station Explorers, and NASA's Space communications and Navigation program. The primary goal of ARISS is to promote exploration of science, technology, engineering, the arts, and mathematics topics. ARISS does this by organizing scheduled contacts via amateur radio between crew members aboard the ISS and students. Before and during these radio contacts, students, educators, parents, and communities take part in hands-on learning activities tied to space, space technologies, and amateur radio. For more information, see www.ariss.org

[ANS thanks Dave Jordan, AA4KN, ARISS PR for the above information]

ARISS NEWS

conventions, maker faires, and other events.

Events with a confirmed AMSAT presence:

HamCation 2022 - The ARRL National Convention

Friday, February 11th, 2022 to Sunday, February 13, 2022

Central Florida Fairgrounds and Expo Park
4603 West Colonial Drive
Orlando, Florida 32808

<https://www.hamcation.com/>

Hamvention 2022

Friday May 20, 2022 to Sunday May 22, 2022

Greene County Fairgrounds and Expo Center

210 Fairground Road
Xenia, Ohio 45385

<https://hamvention.org/>

2022 Rocky Mountain ARRL Division Convention

Friday, October 7th, 2022 to Sunday, October 9th, 2022

Event Center at Archer
3921 Archer Pkwy
Cheyenne, Wyoming 82007

<https://wyhamcon.org/site>

Clint Bradford, K6LCS reports:

2022 is starting off with a bang! Presentations set for clubs in ...

Tennessee
South Bay CA
New York
British Columbia
Ontario Canada
Victoria BC
Sonoma CA
Tampa FL
Texas
Nevada

Think a 90-minute lively, informative, and fun "How to Work the Easy Satellites" Zoom presentation would be appropriate for your convention or club? Always included are overviews of the ARRL, AMSAT, and ARISS. And pre-presentation questions are solicited and welcome.

Send an email or call!

Clint Bradford K6LCS

AMSAT Ambassador, ARRL instructor
<http://www.work-sat.com>
909-999-SATS (7287)

[ANS thanks Paul Overn, KE0PBR, AMSAT Events page manager, and Clint Bradford, K6LCS, for the above information]

Satellite Shorts From All Over

+ NASA has recognized Amateur Radio on the International Space Station (ARISS) as a science education and research program. Two images of ARISS activity are among those singled out by the space agency as some of the Best Space Station Science Pictures of 2021. The photos feature "some of the best photos of breakthrough investigations crew members worked on in 2021." The complete gallery of photos can be seen at <https://go.nasa.gov/3rdedwh> (ANS thanks ARRL and NASA for the above information)

+ Among the 105 satellites launched on Thursday aboard the SpaceX TR-3 rideshare was the Brazilian satellite PION-BR1, "a radio amateur mission combined with education with the aim of promoting access to space technologies and interaction between students and the radio amateur community." In addition, "the satellite's main mission will be a digital experiment in storing and sending messages using the NGHAm protocol." A downlink on 437.300 MHz has been coordinated. (ANS thanks the International Amateur Radio Union frequency coordination site for the above information.)

+ In addition to the SpaceX Falcon 9 Transporter-3 launch on January 13, Virgin Orbit completed another flight of its air-dropped rocket later the same day off the coast of California. The LauncherOne rocket carried seven mini-payloads into low Earth orbit. The Boeing 747 carrier jet took off from the Mojave runway around 2100 GMT to begin an hour-long flight out to the mission's drop point 35,000 feet (10,700 meters) over the Pacific Ocean. The satellites on-board were from three customers: The U.S. Space Force, SatRevolution of Poland, and Spire. There were no Amateur Radio payloads this time. (ANS thanks Spaceflight Now for the above information)

+ U.S. space tracking has linked the breakup of Chinese satellite Yunhai-1 (02) to a collision with a small piece of debris from a Russian satellite launch, according to NASA. The Yunhai-1 (02) satellite was developed by the Shanghai Academy of Spaceflight Technology and launched in September 2019 into a Sun-synchronous orbit with an altitude of around 783 kilometers. It suffered a breakup event on March 18, 2021, creating a number of pieces of debris. The breakup of Yunhai-1 (02) is the fifth confirmed accidental collision between two cataloged objects, according to the report. A total of 37 fragments from the collision have been cataloged as of 1 October 2021, with four of these having reentered the atmosphere. (ANS thanks SpaceNews.com for the above information)

+ As widely reported in the media, the ESA/NASA James Webb Space Telescope (JWST) has successfully deployed. We can now all breathe out and marvel at how complex it all was. According to NASA, "The unfolding and tensioning of the sunshield involved 139 of Webb's 178 release mechanisms, 70 hinge assemblies, eight deployment motors, roughly 400 pulleys, and 90 individual cables totaling roughly one quarter of a mile in length." The telescope now faces approximately six more months of commissioning and calibration before beginning operation. (ANS thanks NASA and The Orbital Index for the above information)

+ Now that the JWST is deployed and could have a lifespan of 20 years, some are already turning attention to NASA's next telescope. The wide-field infrared Nancy Grace Roman Space Telescope (née WFIRST) is scheduled to

launch in 2025. Like JWST, it will also orbit at the Sun-Earth L2 point. The NGRST has two instruments: the Wide Field Instrument, a 300-megapixel camera with a Hubble-class 2.4 m aperture, but 100x the field of view, and the Coronagraph Instrument, for imaging and spectroscopy of nearby exoplanets. It is predicted to find 100,000 transiting exoplanets, expanding far beyond the 4,884 exoplanets discovered so far. (ANS thanks The Orbital Index for the above information)

Join AMSAT today at <https://launch.amsat.org/>

In addition to regular membership, AMSAT offers membership to:

- * Societies (a recognized group, clubs or organization).
- * Primary and secondary school students are eligible for membership at one-half the standard yearly rate.
- * Post-secondary school students enrolled in at least half time status shall be eligible for the student rate for a maximum of 6 post-secondary years in this status.
- * Memberships are available for annual and lifetime terms.

Contact info [at] amsat.org for additional membership information.

73 and remember to help Keep Amateur Radio in Space!

This week's ANS Editor, Mark Johns, K0JM
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